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OF BOSTON.

Read at the Annual Meeting of the Massachusetts Medical Society,
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THE TREATMENT OF PROLAPSE OF THE UTERUS.

Prolapse may be defined as a downward displacement of the uterus in which the cervix appears at the vulva. It is a species of hernia. The distinction between complete and incomplete prolapse is of little practical importance because the terms have a variety of meanings. For example, the uterus lies entirely outside the vulva, a condition which, strictly speaking, should be called complete prolapse, very exceptionally and in complete prolapse the vagina may or may not be completely inverted. Falling of the womb is a term popularly used to designate prolapse, and procidentia is usually applied to the more extreme forms. We must describe in each case the position of the uterus with reference to the surrounding structures; how much the os externum projects beyond the introitus vaginæ; the length of the cervix; the length of the body; the amount of eversion of the vagina; whether the bladder is dislocated and if so how much; the condition of the vaginal walls; whether the uterus is replaceable; the condition of the pelvic floor and so on.

The supravaginal portion of the cervix may be hypertrophied to such an extent that the cervix projects outside the vulva, while at the same time the position of the fundus of the uterus is little if any altered from normal. Such a conditon is clearly one of prolapse, although some authorities have maintained that it is not. On the other hand there is a certain amount of descent of the uterus in retroversion

and following laceration of the pelvic floor and weakening of the uterine ligaments from whatever cause. This condition is not commonly classed as prolapse.

The object of treatment in prolapse is to restore the uterus and vagina and bladder if dislocated to approximately normal positions and to maintain them there by strengthening natural supports if possible, and, failing in this, to provide artificial supports.

At the outset it is important to have a clear conception of the anatomy of the structures and the nature of the forces concerned in this dislocation.

The position of the uterus in the pelvis under normal conditions is determined by its specific gravity, *i.e.* whether small and light or large and heavy; by the intra-abdominal pressure acting on it in all directions; and by its attachments to the surrounding pelvic organs and tissues.

Suppose a healthy nulliparous woman in the erect posture. The long axis of the uterus lies in the axis of the true pelvis with the fundus uteri touching a line drawn from the upper margin of the symphysis pubis to the promontory of the sacrum. The external os points towards the coccyx and is distant from it an inch, more or less. The long axis of the uterus is at right angles to the long axis of the vagina. When the bladder is full the uterus is retroverted and its axis approaches more nearly to the axis of the vagina. The uterus as it were floats in the peritoneal cavity. Although there is only a small amount of fluid in the peritoneum, under normal conditions the intestines with their fluid or semi-fluid contents filling the peritoneum, a closed sac, render the conditions about the same as if the peritoneum were filled with fluid. The position of the uterus is governed by the same rules of physics which determine the position of a body of given density floating in a closed vessel in a fluid of known density. Pressure is exerted on the body in all directions equally. If the body

is heavier it tends to maintain a lower level, and if lighter a higher level.

If the genital cleft, the pelvic floor and the vagina are in their normal state the bottom of the vessel is intact, so to speak, and the pressure on the different aspects of the uterus is the same; just as much up as down, just as much forward as back. If on the contrary the fat of the labia majora and thighs, which helps to close the vulva, is atrophied, if the pelvic floor has been torn and the vagina, instead of being shut is gaping, a column of air takes the place of the bottom of the vessel. Even then the abdominal contents and the uterus would not sink down if the abdominal walls and the diaphragm were rigid. You have all tried the experiment in hydrostatics of filling a tumbler with water level with the brim and then placing a piece of paper over it and inverting the tumbler. The water does not run out of the tumbler because it is held in by the pressure of the atmosphere, some fifteen pounds to the square inch, acting on the paper from below but not acting on the upper surface of the water because of the bottom of the tumbler.

The diaphragm and the abdominal walls represent the bottom and sides of the tumbler, but they are not rigid, and under certain conditions following pregnancy and in old age the abdominal walls lose their normal tonicity and become flabby, so that the retentive power of the abdomen is in a measure lost. Not only that, but the pressure from above may be increased by constant coughing, straining at stool, lifting heavy weights, by tight lacing, by enteroptosis or by ascites or abdominal tumors.

There are four sets of ligaments which steady the uterus in place much as the guys of a derrick prevent the derrick from falling. They are the vesico-uterine, the utero-sacral, and the round and broad ligaments, and to these must be added the attachments of the uterus to the vagina. Under normal conditions the ligaments act simply as guys and

not as supports. Under abnormal conditions they may be called upon to take a large portion of the strain upon themselves.

The uterus then may be said to be elastically suspended or floating in the pelvis, its mobility limited by the attachments of the broad ligaments along its sides, by the round ligaments and utero-vesical ligaments in front, and by the utero-sacral ligaments behind. The range of motion of the cervix is still further restricted by its attachments to the vagina. The uterus moves every time the patient breathes or takes a step and when she coughs and sneezes, and it is somewhat lower in the pelvis when the woman is standing than when she is lying down. It is not an uncommon experience to see a uterus which has formerly been prolapsed held in place by an attack of pelvic inflammation and the prolapse cured, only to return when the inflammatory exudate has gone.

Suppose the pelvic floor and perineum have been ruptured in childbearing, the vagina gapes and its walls are flabby, and its long axis has been carried backward several degrees by the lack of support from behind, there is a tear in the cervix and the uterus has not involuted as it should, and, being heavy, is low in the pelvis. The ligaments of the uterus have not regained their tone and the organ is retroverted, perhaps helped to this position by insufficient attention on the part of the patient to emptying the bladder. The uterine axis and that of the vagina coinciding any extra pressure from above, and acting on the anterior or upper face of the fundus instead of upon the posterior face of the through fundus, gradually forces the cervix like a wedge down the vagina until a condition of prolapse is established.

It is important to note that a retroflexed uterus and an anteverted uterus cannot be prolapsed, lying as each does with its long axis at right angles to the long axis of the vagina, provided the pelvic floor is intact.

After the menopause, senile atrophy of the vagina, the vagina becoming shorter, tends to favor prolapse by the action of the vagina pulling downward on the cervix, while at the same time the disappearance of the fat in the labia majora and thighs opens the genital cleft, and the wasting of the abdominal muscles lessens the retentive power of the abdomen.

In certain forms of prolapse the cervix is enormously elongated with or without dislocation of the fundus. Such a condition is thought to result from prolonged traction by the vagina on a lacerated cervix associated with a certain amount of hypertrophy of the cervix due to chronic passive congestion. It is to be said, however, that this elongation of the cervix is found in the virgin and the nulliparous woman. The vagina is inverted to a greater or less degree in prolapse, generally carrying the bladder with it. There is some difference of opinion as to whether prolapse of the anterior wall of the vagina is the cause or the result of descent of the uterus, and it would seem that in some cases it is one and in others the other.

The rectum is seldom included in the prolapse anything more than a rectocele of moderate dimensions, but the peritoneum both between the bladder and the uterus, and between the rectum and the uterus generally follows the inversion of the vagina, and, in operating for prolapse we must remember that the peritoneal cavity as well as the bladder is often represented in the tumor. We should not forget that stagnation of urine and infection in a dislocated bladder sometimes leads not only to cystitis but to ascending infection of the ureters and kidneys.

In the consideration of the treatment of prolapse the most important portion is prophylaxis. In this connection a quotation from B. S. Schultze is not out of place. He says: "The puerperal state favors the origin of prolapse because in the first place it favors that of retroversion. A

very large number of retroversions may be traced by their history directly back to some puerperal condition premature or otherwise and retroversion recurring soon after confinement is far more often accompanied by descent than when it happens to a woman who has never been a mother, for all the attachments of the uterus have been relaxed by the tension, extension and change in the position incident to the gravid state. The sooner retroversion occurs after childbed, the more easily, on the average, is prolapsus uteri developed from it." ". . . . . in the puerperal state the prolapsed anterior vaginal wall may in some cases absolutely draw the uterus down out of its normal position.

The wide, roomy and relaxed vagina is much more prone to prolapse soon after childbed, in any case where there has been a previous retroversion; the bladder, stretched out during pregnancy, is then relaxed also and, its contents being under the influence of intra-abdominal pressure, helps in the further depression of any uterus already lying in a position of retroversion with descent."

If we accept as facts these statements of a careful observer the conclusion is obvious, every woman should be subjected to a vaginal examination after the puerperium and a dislocated uterus supported by tampons or pessary, or the vagina, if relaxed, treated by astringent douches or suppositories and the amount of active and violent exercise limited until involution of the uterine organs has taken place.

Extensive injuries of the pelvic floor and cervix should be repaired with the object of assuring involution. It goes without saying that every effort should be made by careful management of labor to prevent such injuries. A physician's whole duty to his patient is not terminated when, following labor, his patient is up and about, she has no trouble with her breasts and the baby is well. He ought to know the exact condition of her uterine organs. It often takes five years or longer to develop a prolapse, which

causes annoying symptoms, from post puerperal injuries that might have been rectified in the months following labor.

In the treatment of an existing prolapse the first indication is the reposition of the organ in its normal position. In this way the passive congestion incident to the malposition is relieved, and ulcerated portions of the prolapse can best be treated.

The patient being in the dorsal position, the clothing thoroughly loosened, the bladder and rectum empty, the tumor should be carefully bathed with weak corrosive solution, anointed with vaseline and then grasped in the fingers of one hand. A little kneading and pushing will generally succeed in working it inside the vulva. In exceptional cases the knee-chest position is useful in making reposition. In the rare cases caused by the growth of abdominal tumors and by ascites and in those in which the uterus is limited in its mobility by pelvic inflammatory exudate, the prolapse is irreducible until the cause has been removed.

The uterus when first returned to the pelvis generally takes the position of retroflexion. By bimanual manipulation it should be placed in anteversion. Finally the vagina should be packed, preferably with dry cotton tampons dusted freely with boric acid powder. If ulcerations are present the packings should be renewed every second day. In other cases they may be left in place three or four days. Where the vulva and perineum are patulous a pad of cotton the size of a tennis ball should be placed on the vulva after the packing is in place, and held in position by a T bandage. If possible, the patient should maintain the recumbent posture and in any event every effort should be made to reduce the intra-abdominal pressure from above to a minimum, by treating a chronic cough or chronic diarrhœa and changing occupations which necessitate heavy lifting and straining. Tight lacing must be forbidden.

Various sorts of medicated applications may be made to ulcerated surfaces on the vagina by soaking the cotton of the packing with glycerine and ichthyol, glycerite of tannin, glycerine with iodoform, iodol or aristol, etc. When the ulcerations have healed and the vagina begins to lose the smooth, dry, integumentary appearance so characteristic of inverted vagina, we may begin to devote our attention to measures calculated to retain the uterus and vagina permanently in their normal situation.

Our task is made easier if the perineum still retains something of its former strength. In this event a well fitting Albert Smith or Thomas pessary will sometimes hold the uterus in place. More often it will not. Then we have recourse to the Gehrung pessary or the Meigs' elastic ring. Skene's cystocele pessary and the figure of eight pessary of Schultze have proved useful in my experience. Failing in the use of these we may try as a last resort a cup or ring pessary attached by a rubber tube to a belt around the waist.

Some patients, a decreasing number in these days, who are too old or too feeble to undergo a radical operation for the relief of prolapse, and many women in whom the prolapse has existed a comparatively short time, are made comfortable, and, in the latter class, permanently cured by the use of one of the forms of pessaries enumerated. Many of the intelligent patients may be taught to remove, cleanse and replace their pessaries themselves. It should be impressed upon the patient's mind by varied iterations that a pessary is a foreign body and must be frequently inspected and cleansed or much harm may result in the way of ulcerations from pressure. Some vaginæ are more tolerant to pessaries than others, but no pessary should be left in the vagina indefinitely.

In young women in whom prolapse has not existed too long, strong hope should be entertained of restoring the

natural supports of the uterus by palliative treatment, and we should not be in too great haste to advise operation as soon as we have made our diagnosis.

To summarize: The palliative treatment of prolapse consists in restoring the uterus to the pelvis and holding it as far as possible in its normal axis by cotton tampons until all ulcerations are healed and the vagina has regained a more healthy tone. At the same time efforts are made to reduce the intra-abdominal pressure from above by ordering the recumbent posture, removing tight clothing from around the waist and other measures, and finally, in attempting to support the uterus in its normal position by a suitable pessary, coming as a last resort to a pessary attached to a belt.

The radical or operative treatment consists of the following procedures:—

1. Repair of lacerated cervix.
2. Amputation of cervix.
3. Restoration of the pelvic floor and perineum.
4. Narrowing of the vagina.
5. Shortening of the round ligaments.
6. Attachment of the anterior face of the fundus uteri to the vagina or bladder.
7. Attachment of the posterior face of the fundus uteri to the abdominal wall.
8. Removal of the uterus.
9. Combinations of the above.

I. The first object in the operative treatment of prolapse is to get rid of the results of passive congestion and inflammation in the tissues of the uterus and thus insure involution and a diminution in the size and weight of the organ. To this end curetting and the repair of a torn cervix is indicated. Trachelorrhaphy should be preferred to amputation in young women and in cases where there is not excessive hypertrophy and induration of the lips of the torn cervix, because our object is always to restore to the normal

condition. The cervix has important functions in labor and a uterus without a cervix is more difficult to maintain in its proper axis. The usual Emmet operation fulfills every indication.

2. Amputation of the cervix is called for when there is present hypertrophic elongation of the cervix or when there is excessive enlargement or induration of the lips. The Sims operation has the best reputation but the Schrœder method of amputating is often useful. It is important that the uterine canal should be left large enough and should be covered with mucous membrane, both in amputating and in performing trachelorrhaphy, to prevent subsequent stenosis. It is my practice to do a curetting in every case of amputation and trachelorrhaphy, because of the endometritis which usually accompanies uterine misplacement of long standing.

3. The restoration of the pelvic floor and perineum accomplishes perhaps more than any other procedure towards the cure of prolapse. By it the normal axis of the vagina is restored and the patulous condition of the introitus vaginæ is done away with. The object sought is, as in the case of the cervix, to bring the structures to their original status except that in old women having atrophy of the tissues of the pelvic floor it may be allowable to unite tissues which were not intended to be united. That is to say, it may be advisable to unite the labia majora for the purpose of closing the genital cleft. Complete closure of the vagina for prolapse has been advocated and practised in the past by various operators and has been found unsuccessful, for subsequent to operation the tissues have stretched gradually and the prolapse has returned.

The operations on the posterior wall of the vagina and perineum which have given the best results in my experience are the Emmet and Hegar. In both most of the operation is in the vagina where the injury has taken place

rather than outside. If the lacerations in the pelvic floor have been in the sulci on either side of the vagina, the Emmet operation is preferable; if in the median line the Hegar, with a triangular denudation from just below the cervix to the fourchette, is to be chosen. The stitches should be passed deeply so that they catch up the sundered muscles and fascia. My preference is for interrupted sutures, part catgut and part silkwormgut; and the latter, the outside sutures, are left in position for from eight to ten days.

It is imperative that after all plastic operations on the vagina for prolapse that the patient should maintain the recumbent posture for at least three weeks so that union in the tissues may be firm (experimental researches teach that it takes three weeks to obtain a solid uniting of apposed surfaces), and to avoid subjecting the newly joined structures to pressure from above. I am convinced that many failures are due to a neglect of this precaution and to the employment of operative procedures, such as the flap splitting operations, which draw the structures of the pelvic floor downward and outward instead of upward and inward where they belong.

4. Various measures have been adopted to narrow the vagina. Lefort's operation has been practised extensively abroad. It consists in uniting the anterior and posterior vaginal walls from the cervix to the ostium vaginæ by denuding a narrow strip on both walls in the median line and then bringing the two lines together by sutures. Thus the vagina is converted into two tubes lying side by side. The operation has manifest disadvantages as in no way approximating a normal condition. Lateral elytrorrhaphy, which has for its object the restoration of the upper exremity of the vagina and of the anterior vaginal wall to its normal location and direction has been advocated by certain gynecologists and has much to recommend it on theoretical grounds. In dislocation of the urethra downward, I have

found Skone's operation for stitching the tissues about the upper urethra to the subpubic ligament of value.

The essential point to be borne in mind in all operations on the anterior and lateral vaginal walls is that the object to be attained is the lengthening and stiffening of the anterior wall so that the cervix may be carried backward, the uterus anteverted, and the intra-abdominal pressure exerted on the posterior instead of on the anterior face of the fundus. The oval denudation on the anterior wall extending from the cervix to the lower portion of the urethra and closed by transverse interrupted sutures has about the best reputation. The Stoltz purse string operation is of doubtful value because it does not lengthen the distance from the cervix to the vulva.

5. Alexander's operation for shortening the round ligaments is not an especially valuable operation in prolapse for the reason that although it removes the slender portions of the round ligaments and raises the uterus as a whole in the pelvis it does not antevert the organ.

Shortening the round ligaments through the anterior vagina or shortening them through an abdominal incision has the disadvantage that the strong portions of the ligaments are shortened while the outer weaker ends have to bear the strain, and, as has just been said of the Alexander operation, shortening the round ligaments does not antevert the uterus. The results by these methods are said to be good in retroversion but they are of doubtful value in prolapse.

While we are considering the utilization of the natural supports and guys of the uterus for maintaining the organ in position and before taking up the more artificial measures, those that stitch the uterus to surrounding structures, it may be well to mention shortening the utero-sacral ligaments.

Stitching the cervix to the posterior cul-de-sac of the vagina has been resorted to as a means of holding the cer-

vix back, but as the vagina is far from being a fixed point in prolapse not much ought to be expected of this measure. The utero-sacral ligaments are much stronger than the round ligaments and have a more important office in anteverting the uretus. In Savage and Kiwisch's experiments to produce a prolapse of the uterus artificially the tension on the utero-sacral ligaments offered the greatest resistance, the prolapse occurring as soon as they were divided. Ought not we to make use of these ligaments if possible in the treatment of prolapse? In one case of prolapse I have shortened them through an incision in the posterior cul-de-sac of the vagina and the immediate and remote results were good. It is too early as yet to say much about the operation but it may be possible to shorten them successfully both through the vagina and through the abdominal incision. The subject is mentioned here rather as a suggestion than as one of the recognized methods of treatment.

6. The uterus has been held in anteversion in cases of prolapse and retroversion by stitching the anterior face of the fundus to the bladder or to the edges of the vagina after first performing anterior colpotomy. The vagina and bladder being as a rule dislocated and lax in cases of prolapse this method of operating would not commend itself, leaving out of account the fact that as done in the past the operation has been proved to be a cause of dystocia in subsequent pregnancy.

7. Ventral suspension or fixation as it was formerly called has a distinct value as an operative procedure in prolapse. It is not to be forgotten that this operation is not in any way to take the place of restoration of the natural supports of the uterus. It is a distinctly artificial measure. Nature never intended the fundus uteri to be attached to anything. It was to be free to enlarge with advancing pregnancy and involute after the expulsion of the child. Experience with the suspension operation has proved that the elastic liga-

ment which is formed between the parietal peritoneum and the posterior face of the fundus uteri, following properly executed operations of this sort, in no way interferes with subsequent pregnancy. The suspension operation is a failure in cases of prolapse when a heavy uterus is attached to the abdominal wall and no attempt is made to repair the pelvic floor and anterior and posterior vaginal walls and cervix. The chief value of the suspension operation is to direct the intra-abdominal pressure upon the back of the uterus. An anteverted uterus cannot be prolapsed.

In performing the operation I follow the technique of Howard Kelly except that I always use absorbable ligatures of chromicised catgut or kangaroo tendon and catch up enough of the transversalis fascia to prevent the parietal peritoneum from being stripped from the fascia subsequent to operation. If a suspensory ligament is sure to be formed, and we cannot, even if we wish, maintain the fundus permanently in close apposition with the parietal peritoneum, I fail to see the advantage of a non-absorbable ligature. The disadvantages of such a ligature are many.

8. Hysterectomy is called for in rare cases of irreducible prolapse where there is a suspicion of malignancy and in women who are near the menopause whose uteri are the seat of chronic metritis.

Hysterectomy alone without plastic operations on the vagina and pelvic floor fails to cure the prolapse. Some years ago, when the furore for abdominal operating came in, attempts were made to treat all pelvic diseases by this route, but from what has been said it is plain why prolapse cannot be cured by removal of the uterus. The uterus, to be sure, cannot prolapse, but the vagina, bladder and abdominal contents can. Some success has been attained by attaching the vagina to the stumps of the broad ligaments after hysterectomy. Hysterectomy by itelf cannot be considered a leading operation in the treatment of prolapse,

because prolapse generally includes dislocation of the vagina and bladder.

9. It is plain that there is no one operation which is a specific in prolapse. There are many obstinate cases of long standing prolapse in old women with lax abdominal walls, atrophy of the vulva, perineum and vagina, in which permanent cure is a difficult matter. Whence the diversity and multiplicity of operations invented for the relief of this disease. In cases of recent origin I have obtained good permanent results from trachelorrhaphy and anterior and posterior colporrhaphy, the patient perhaps wearing a pessary for several months subsequent to operation to antevert the uterus. In cases of long standing I have added a ventral suspension to the operations just enumerated with good late results. All the operations are usually done at one sitting. To summarize: Treat prolapse by palliative methods if there is a reasonable prospect of ultimate success. If not, aim to restore the uterus to its normal size and shape, and by repairing the injuries of the pelvic floor and perineum by painstaking plastic operations endeavor to reestablish the proper relations of the uterus and vagina, adding abdominal operations and the more artificial measures only in the extreme cases of long standing.